The Validity and Reliability Study of the Turkish Version of the Online Technologies Self-Efficacy Scale

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Abstract

The aim of the present study is to adapt a scale of self-efficacy towards online technologies which was developed by Miltiadou and Yu (2000) to Turkish. In order to adapt the scale, first, the scale items were translated to Turkish by the researchers. Then, a translation form was further developed by consulting eight specialists. These English and Turkish forms were both responded by 30 undergraduate students at Middle East Technical University, department of Computer Education and Instructional Technology with two-week intervals, respectively. Two forms were accepted as equal since the correlation between them was .89. The Turkish version of the scale was implemented on 276 students who took the course in an online environment for validity and reliability studies. The scale has four factors, which was found as result of the exploratory and confirmatory factor analyses. In its original form for the whole scale, the Cronbach alpha value was calculated as .95. In the Turkish version of the scale, alpha value was calculated as .94. Therefore, it can be concluded that the Turkish version of the scale was reliable and valid.

Key Words

Online Technology Self Efficacy Scale, Online Learning, Self-Efficacy.

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According to Bandura (1986), self-efficacy is defined as an accomplishment of a mission in a special effect area and the idea of ability of gathering production as a result. Schunk (1991) also defined self-efficacy as actual determiner of a person's ability to control self-learning. Self-efficacy is related to a person's confidence in his/her ability to do something. It also refers to individuals' confidence in their abilities to control their thoughts, emotions, attitudes, and behaviors. In this respect, it affects the performance towards a certain event and this performance directly affects the results.

The perception of self efficacy is contextual and is specific to tasks and situations. Individuals benefit from these judgments in relation to some purposes. Many people deal with tasks which make them feel self-confident and sufficient; however, they avoid the tasks which they think they are not able to perform. Self-efficacy perception is also influenced by the achievement level that individuals perceive and the amount of fear and stress in individualized experiences while dealing with a task (Pajares, 2002).

Self-efficacy perception in education is considered as related to effort, insistence, and success. In this respect, a general perception of self-efficacy cannot be established. Self-efficacy is having different perceptions in different situations and is affected by variables in differing situations. Variables in any situation can affect the person negatively or positively. Whether being familiar to a technology utilized in a learning activity may be an example of this type of an influence.

The perception of self-efficacy affects task selection, effort, insistence, flexibility, and achievement (Bandura, 1997). This kind of perception can directly be related to distance learning applications because self-efficacy affects task selection, effort, insistence, flexibility, and achievement which means that it takes place in distance education as a factor directly associated with learning and performance.

There are three types of self-efficacy in online education. The first one is self-efficacy towards online technologies (Miltiadou, & Yu, 2000), the second is self-efficacy towards content (Lee, & Witta, 2001; Wang, & Newlin, 2002) and the third is self-efficacy towards distance learning (Nahm, & Resnick, 2008; Randall, 2001; Zhang, Li, Duan, & Wu, 2001).

One of the self-efficacy perceptions of students in distant education is towards distance learning. Namely, students may have self-efficacy

perception in terms of whether they can learn in distance learning environments. In their research, Zhang et al., (2001) aimed to determine the effects of self-efficacy perception towards distance learning environments on students' achievement by using a Likert-type scale consisting of eight items. Moreover, Randall (2001) studied the self-efficacy perception towards online learning and related variables in his work for which a 3-factor and 32-item Likert scale was developed. In addition, Nahm and Resnick (2008) aimed to develop self-efficacy scale for adults in web-based learning environment and at the end of their study they developed an-eight-item Likert type scale.

The increase of the students' self-efficacy provided the increase of student's participation to interaction (Hillman, Willis and Gunawardena, 1994; Moore, 1989). Self-efficacy is an important factor in distance learning. Therefore, the self-efficacy perception towards the usage of technology attains an importance (Miltiadou, 2000). Students' perception towards online technology affects the interaction between the students to students and also students to instructors and the usage of technology (Miltiadou & Savenye, 2003).

Besides having self-efficacy in distance learning, students need a high level of self-efficacy in the content of lessons in order to be successful and motivated in online courses. However, having self-efficacy towards the content of lessons was not sufficient for success in online courses. Having high self-efficacy to learn the content of online course may not provide self-confidence. In online learning, participants need to use technology widely. Being successful in online courses is related to students' performance of searching information, browsing on the Internet, receiving and transmitting e-mails, and using technology efficiently to access course materials. If students do not have sufficient experience and skills, they do not feel themselves sufficient in participation to online learning and this may cause anxiety.

The OTSES scale was developed by Miltadou and Yu. While DeTure (2003, 2004), Lee (2005), Puzziferro (2006) and Sanders (2006) used this scale in one-factor structure, Stackpole-Hodges and Hodges (2005), Ataizi (2006) and also Martinez (2007) used it in four-factor structure. On the other hand, Bayston (2000), Lee (2001), Lee and Witta (2001) used this scale by after modifying it. The first research on self-efficacy perception in terms of online technologies was conducted by Miltiadou and Yu (2000). The aim of this research was to develop an

online technologies self-efficacy scale. The strong feature of this scale was its measurement of self-efficacy towards the use of technologies. When the literature is reviewed, it is possible to see two groups of research where the scale is used either in its original form or with some adaptations of its items.

Method

The participants of the present research consisted of 276 undergraduate students who were taking a course in educational technologies and material development in the fall semester of 2008-2009 academic year. Blended learning method in which online education is combined with classroom instruction was used during the course. The reason why this group of students was included in the study was that these students took courses on the Internet. The necessary permission to adapt the Online Technologies Self-Efficacy Scale (OTSES) was received from Miltiadou and Yu via electronic mail on 11 October 2005. Exploratory factor analysis (EFA) is performed to examine the factor structure of the scale according to the data obtained from Turkish students and confirmatory factor analysis (CFA) is performed to examine the original scale's structure approved by Turkish experts in Turkish culture. The Cronbach Alpha coefficient and the correlations between the total scores of component-factor were calculated.

Results

The translation of the OTSES into Turkish

The OTSES was translated into Turkish by the researchers and were verified by considering the opinions of eight specialists of whom two were experts of the English language, one was an expert on Turkish, one was an expert on computer education and instructional technology, and three were experts on measurement and evaluation. To control the equivalency between the original and Turkish scales, both forms were administered to 30 undergraduate students who are native Turkish speakers, and were enrolled in the department of Computer Education and Instructional Technology at Middle East Technical University (where the medium of instruction is English), with interval of two weeks, respectively. The Turkish and English versions of the scales might be assumed as equivalent, because the correlations between the English and Turkish versions are found to be .89.

The OTSES

Initially, an Exploratory Factor Analysis (EFA) was calculated. The results of EFA showed that the scale had 29 items with 6 factors, eigenvalue of the first factor was 10, and first factor explained 14.45% of the variance; eigenvalue of the second factor was 3.57, and second factor explained 14.04% of the variance; eigenvalue of the third factor was 2.48, and third factor explained 12.22% of the variance; eigenvalue of the forth factors was 1.92, and the forth factor explained 10.82% of the variance; eigenvalue of the fifth factors was 1.33, and the fifth factor explained 10.39% of the variance; eigenvalue of the sixth factor was 1.08, and the sixth factor explained 8.57% of the variances. However, the original scale had 4 factors. At the end of the EFA, it can be seen that the first and the forth factors are distributed so the scale was made similar to the original scale.

As a result of EFA, first and second confirmatory factor analyses (CFA) were calculated to determine whether the Turkish scale matched the original scale. At the first level of CFA, Chi-Square value (x^2 =1451.37, N=276, df =371, p=.00) which was calculated for the adaptation of the model was found to be significant (χ^2/sd=3.91 RMSEA=0.080, GFI=0.75, AGFI=0.70, CFI=0.93, NFI=0.91 and NNFI=0.92). The second CFA results (which was performed to examine the suitability of the structural model of the OTSES with 4 factors), and the data showed that the model is suitable in general, and they also indicated that there is a significant relationship between the error covariance of item 9 and 25; and item 17 and 26. In this context, it was decided to test the high error correlations which are observed among the items that took place under the same factor (latent variable) in the scale, by adding them to the model, and to perform CFA again. At the second level of CFA, Chi-Square value (x^2 =1397.92, N=276, df =368, p=.00) which was calculated for the adaptation of the model was found to be significant. However, since "x^2/sd" ratio is 3.79, it can be interpreted that the model has acceptable suitability. The goodness of suitability index values of the model are RMSEA=0.078, RMR=0.09, SRMR=0.80, GFI=0.85, AGFI=0.80, CFI = 0.94, and NNFI=0.94. It is expected that RMSEA and RMR values will be close to 0, and the values that are equal to 0.05 or less indicate a well suitability. When the complexity of the model is considered, the values under 0.08 and even 0.10 can also be accepted. When GFI and AGFI indices are 0.95 and over, it indicates a very well suitability. When the values of CFI and NNFI are over 0.95, it indicates

a very well suitability (Jöreskog & Sörbom, 1996; Büyüköztürk, Akgün, Demirel, & Özkahveci, 2004; Şimşek, 2007;). When the results are considered as a whole, it can be said that the structural model of OTSES which consists of 4 factors is suitable for the Turkish culture.

For the latent value and internal consistency, coefficient of Cronbach alpha was also calculated. The Cronbach alpha value for the whole original scale was .95, the Cronbach alpha value for the scale, translated to Turkish is .94. There were not big differences between these two scales. The first factor have .89, the second factor have .85; the third factor have .90 and the forth factor have .89 reliability coefficient. These Cronbach alpha values were also high. The correlation between the total point and the factors' points were changing between .33 and .88 and these were also significant in the level of .01. The correlation between the points of factors was changing between .12 and .63 and also this was significant in the level of .05. It is seen that these correlation values were also sufficient.

Discussion

In this study, the factor structure of the Turkish version of the OTSES (which was originally created by Miltiadou and Yu (2000)) was developed and examined by exploratory and confirmatory factor analyses. The CFA results showed that the factorial model of the scales of the OTSES that consists of 4 factors was at an acceptable degree for Turkish university students. However, the Turkish version of the OTSES needed improvement. Although they were relatively low at some factors, the alpha values of the factors of the OTSES show acceptable reliability especially when the complexity of the structure of the scale was considered.

According to SÇ, TD and R^2 values, the importance, effect and explained variances of all items and factors in latent variable found to be sufficient by two levels of CFA. After this process, consistency index was examined. After the calculation of second level CFA, all factors explained, the OTSES implied variable significantly. As a result of the analysis, fit indexes were found as χ^2=1397.92 (sd=368, p.=.0000), χ^2/sd=3.79 RMSEA=0.078, RMR=0.09; SRMR=0.80, GFI=0.85, AGFI=0.80, IFI=0.94, CFI=0.94, NFI=0.92, and NNFI=0.94. Jöreskog and Sörbom, (1996), Byrne (1998), Sümer (2000), Büyüköztürk et al. (2004), and Şimşek (2007) indicated that being χ^2/sd as .05 or below

and RMSEA as .08 or below shows good consistency. In addition, Byrne (1998) and Sümer (2000) mentioned that RMR and SRMR values .10 or below show that there is good consistency. Moreover, IFI, CFI, NFI and NNFI as .90 or above represent a good model. Büyüköztürk et al. (2004) indicated that AGFI as .80 or above; GFI as .85 or above shows that there is good consistency. All values are qualified to represent good consistency.

The reliability of latent variable and factors were checked with Cronbach alpha. Cronbach alpha value of original form of the scale found as .95 and Cronbach alpha value of Turkish form of the scale was found as .94. It was found that there were no big differences between the original form and Turkish form. It was found that the first factor had .89, the second factor had .85, the third factor had .90 and the fourth factor had .89 reliability values. Cronbach values were found high for the factors. Correlations between total point of the scale and factor points were changing at the interval of .33 to .88, and had significant difference at the level of .01. Moreover, correlations between factor points were changing at the interval of .12 to .63, and had significant difference at the level of .05.

In the development and applications of the original scale, the participants were only distance learning students; However, the Turkish form of the scale was implemented on blended learning students who took blended courses only for five weeks period. Studies should be implemented with distance learning students who are executing learning activities with blended learning model, to determine the effect of the scale on Turkish culture. Online technologies are used in face to face learning and social life, for this reason, the OTSES can be used to compare perceptions of self efficacy of face to face learning students and distance learning students.

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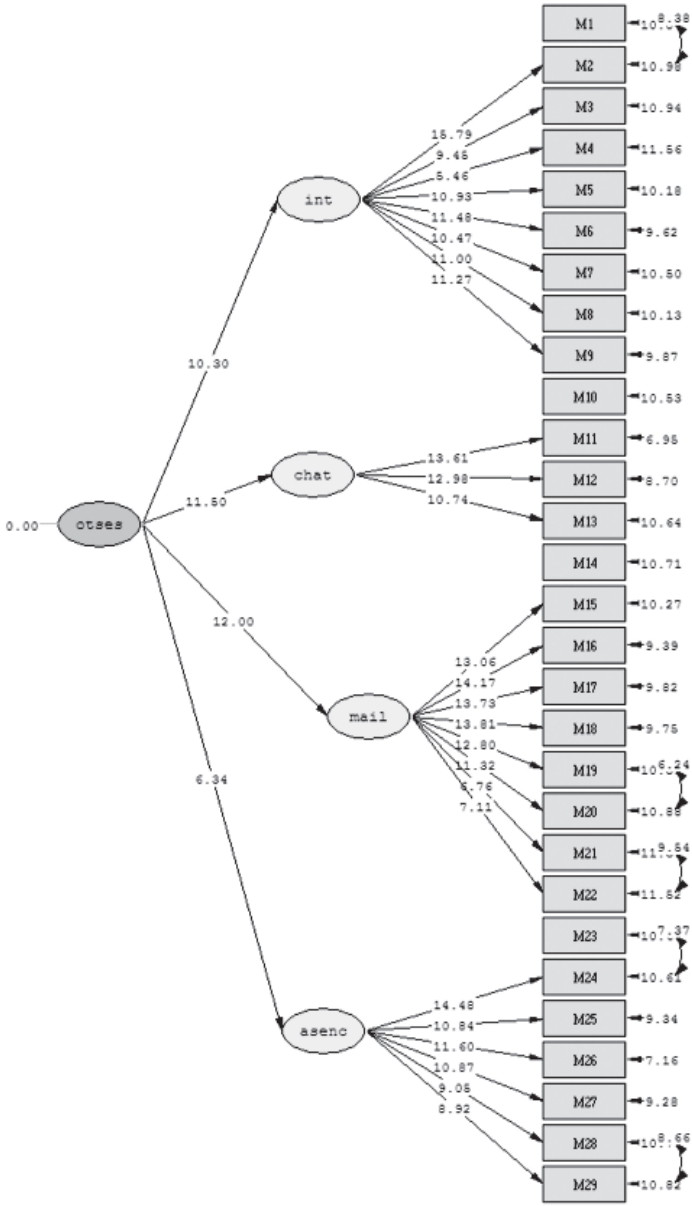

Ek-1. *ÇTYÖ Ölçeği'nin İkinci Düzey DFA Sonuçları*

Ek-2. *Çevrim İçi Teknolojilere Yönelik Öz Yeterlik Algısı (ÇTYÖ) Ölçeği*

Aşağıdaki maddelerde kendinize ne kadar güvendiğinizi yan tarafta yer alan maddelerde işaretleyiniz. Bu maddelerde 1= tamamen katılmıyorum, 2= katılmıyorum, 3= kararsızım, 4= katılıyorum ve 5=tamamen katılıyorum, olarak değerlendirilmelidir.

Maddeler		1	2	3	4	5
1.	İnternet Explorer gibi bir tarayıcı programı açma konusunda kendime güveniyorum.					
2.	Web sitesinden metinleri okuma konusunda kendime güveniyorum.					
3.	İstediğimiz başka bir web sayfasına gitmek için bir bağlantıya tıklama konusunda kendime güveniyorum.					
4.	Adresini girerek istenilen web sayfasını açma konusunda kendime güveniyorum.					
5.	Bir web sitesinin adresini kısayol olarak kaydetme konusunda kendime güveniyorum.					
6.	Yazıcıdan bir web sayfasının çıktısını alma konusunda kendime güveniyorum.					
7.	Uygun anahtar kelimeleri kullanarak internette arama yapma konusunda kendime güveniyorum.					
8.	Bir web sayfasındaki resmi diskete kaydetme konusunda kendime güveniyorum.					
9.	Bir web sayfasında istenilen metni kopyalayıp word gibi bir kelime işlem programında açılan belgeye yapıştırma konusunda kendime güveniyorum.					
10.	Gerektiğinde bir eş zamanlı sohbet sistemini kullanmak için takma ad alma konusunda kendime güveniyorum.					
11.	Eş zamanlı sohbet sisteminde birden fazla kişinin mesajını okuma konusunda kendime güveniyorum.					
12.	Eş zamanlı sohbet sisteminde gelen mesajı yanıtlama ve sistemdeki herkese mesaj yollama konusunda kendime güveniyorum.					
13.	Eş zamanlı sohbet sisteminde istediğimiz kişiyle birebir özel görüşme yapma konusunda kendime güveniyorum.					
14.	Bir e-posta sisteminde oturum açma ve kapama konusunda kendime güveniyorum.					
15.	İstenen kişiye e-posta gönderme konusunda kendime güveniyorum.					

16.	Aynı anda birden çok kişiye e-posta gönderme konusunda kendime güveniyorum.
17.	Bir e-posta mesajını yanıtlama konusunda kendime güveniyorum.
18.	Bir e-posta mesajını başka bir kişiye iletme konusunda kendime güveniyorum.
19.	Bir e-posta mesajını silme konusunda kendime güveniyorum.
20.	Bir adres defteri oluşturma konusunda kendime güveniyorum.
21.	E-posta ekinde gelen bir dosyayı sabit diske kopyalama ve bu dosyayı açma konusunda kendime güveniyorum.
22.	Bir e-postaya dosya ekleme ve gönderme konusunda kendime güveniyorum.
23.	Eş zamansız bir konferans sisteminde oturum açma ve kapatma konusunda kendime güveniyorum.
24.	Eş zamanlı bir konferans sistemine yeni bir mesaj yollama konusunda kendime güveniyorum.
25.	Eş zamansız bir konferans sistemine gönderilmiş olan bir mesajı okuma konusunda kendime güveniyorum.
26.	Eş zamansız bir konferans sistemine gönderilen mesajı bütün üyelerin görebileceği şekilde yanıtlama konusunda kendime güveniyorum.
27.	Eş zamansız bir konferans sistemine gönderilen mesajı sadece istenen bir üyenin görebileceği şekilde yanıtlama konusunda kendime güveniyorum.
28.	Bir dosyayı eş zamansız bir konferans siteminden sabit diske kaydetme konusunda kendime güveniyorum.
29.	Bir dosyayı eş zamansız bir konferans sitemine yükleme konusunda kendime güveniyorum.